

1 WHAT IS CLAIMED IS:

2

3 1. A zeolite having a mole ratio of silicon oxide to aluminum oxide greater
4 than about 20:1 to less than 40:1, with crystallites having small broad
5 lathe-like components in the range of 200-400A, and having the x-ray
6 diffraction lines of Table 1.

7

8 2. The zeolite of claim 1, having an Argon adsorption ratio (defined as the
9 fraction Ar adsorption at 87K between the relative pressures of 0.001
10 and 0.1) / (total Ar adsorption up to the relative pressure of 0.1) that is
11 greater than 0.5, with a minimum micropore volume of 0.02 cc/gm for
12 the zeolite.

13

14 3. The zeolite of claim 2, wherein the Argon adsorption ratio is in the
15 range from 0.55 to 0.70.

16

17 4. The zeolite of claim 1, having an external surface area in the range
18 from 80 to 300 m²/gm.

19

20 5. A method of preparing a dewaxing catalyst suitable for use in a
21 process for dewaxing a hydrocarbon feed to produce an isomerized
22 product, said catalyst possessing less defined crystallinity, reduced
23 micropore volume, increased surface area and reduced cracking
24 activity over other intermediate pore size molecular sieves used for
25 isomerization, the feed including straight chain and slightly branched
26 chain paraffins having 10 or more carbon atoms, the method of
27 preparation comprising the following steps:

28

29 (a) synthesizing a zeolite having a mole ratio of silicon oxide to
30 aluminum oxide greater than greater than about 20:1 to less
31 than 40:1, with crystallites having small broad lathe-like
32 components in the range of 200-400A, and having the x-ray
33 diffraction lines of Table 1 by employing the following steps:

- 1
2 (i) combining the following reagents in the amounts
3 specified to form a mixture:
4
5 (1) 5 parts of an N-lower alkyl -N-methyl -N'-
6 isopropyl-imidazolium cation which has been ion-
7 exchanged to the hydroxide form;
8
9 (2) 20 parts of an alkali metal hydroxide;
10
11 (3) 100 parts of SiO_2 to 3.5 parts of Al_2O_3 ;
12
13 (4) 20 parts of an alkyl amine.
14
15 (ii) stirring the mixture of step (i) in an autoclave, under
16 autogenous pressure, in a range of from 500 to 1500 rpm
17 for a period of from 0 to 5 hours;
18
19 (iii) maintaining the mixture at an elevated temperature for a
20 period of from 40 to 120 hours to form the crystals of the
21 zeolite;
22
23 (iv) collecting the crystals of the zeolite by filtration or
24 centrifugation;
25
26 (v) subjecting the crystals to calcinations and ion-exchange;
27
28 (b) mixing the zeolite synthesized in stage (a) with a refractory
29 inorganic oxide carrier precursor and an aqueous solution to
30 form a mixture, the mixture having a molecular sieve content
31 from about 10 to about 90 wt%;
32

- 1 (c) extruding or forming the mixture from step (b) to form an
2 extrudate or formed particle;
3
- 4 (d) drying the extrudate or formed particle of step (c);
5
- 6 (e) calcining the dried extrudate or formed particle of step (d);
7
- 8 (f) loading of the extrudate or formed particle of step(d) with a
9 hydrogenation component or other modifying metal or metals to
10 prepare a catalyst precursor;
11
- 12 (g) drying the catalyst precursor of step (f);
13
- 14 (h) calcining the dried catalyst precursor of step (f) to form a
15 finished bound dewaxing catalyst.
16
- 17 6. A dewaxing catalyst prepared by the method of claim 5.
18
- 19 7. The method of claim 4, wherein the zeolite is SSZ-32X.
20
- 21 8. The method claim 5 (f) where other modifying metals are selected from
22 the groups consisting of magnesium, lanthanum, and other rare earth
23 metals, barium, sodium, praseodymium, strontium, potassium,
24 neodymium and calcium.
25
- 26 9. A zeolite prepared from an aqueous solution having a composition, as
27 synthesized and in the anhydrous state, in terms of mole ratios of
28 oxides as follows: $(0.05 \text{ to } 2.0)Q_2O:(0.1 \text{ to } 2.0)M_2O: Al_2O_3$ (20 to less
29 than 40) SiO_2 wherein M is an alkali metal cation, and Q is the sum of
30 Q_a an N-lower alkyl- N'- isopropylimidazolium cation ,and Q_b , an amine,
31 the zeolite having the X-ray diffraction lines of Table 1, wherein the
32 molar concentration of Q_b is greater than the molar concentration of Q_a .
33

- 1 10. The zeolite of claim 9 wherein Q_a is selected from the group consisting
2 of N-methyl-N'-isopropyl -imidazolium cation and N,N'-diisopropyl-
3 imidazolium cation.
4
- 5 11. The zeolite of claim 9, wherein Q_b is selected from the group consisting
6 of isopropyl, isobutyl, isopentyl, neopentyl or monoethyl amine.
7
- 8 12. The zeolite of claim 9 which has a constraint index in the range from 8
9 to 30.
10
- 11 13. The zeolite of claim 9, which has a silica/alumina ratio in the range
12 from 20 to 40.
13
- 14 14. The zeolite of claim 9, which is prepared by thermal treating the zeolite
15 at a temperature of from 200°C (392°F) to 820°C (1508°F).
16
- 17 15. The zeolite of claim 9 which is ion exchanged with hydrogen,
18 ammonium, rare earth metal, Group IIA metal or Group VIII metal ions.
19
- 20 16. The zeolite of claim 9, wherein rare earth metals, Group IIA metals, or
21 Group VIII metals are occluded in the zeolite.
22
- 23 17. The zeolite of claim 9, which contains modifying metals selected from
24 the groups consisting of magnesium, lanthanum, and other rare earth
25 metals, barium, sodium, praseodymium, strontium, potassium,
26 neodymium and calcium.
27
- 28 18. The process for dewaxing a hydrocarbon feed thereby producing a
29 maximized yield of isomerized product and a minimized yield of light
30 ends, the feed including straight chain and slightly branched paraffins
31 having 10 or more carbon atoms, comprising contacting the feed under
32 isomerization conditions in the presence of hydrogen with catalyst

1 comprising an intermediate pore size molecular sieve which is
2 prepared according to the following steps:

3
4 (a) synthesizing a zeolite having a mole ratio of silicon oxide to
5 aluminum oxide greater than greater than about 20:1 to less
6 than 40:1, with crystallites having small broad lathe-like
7 components in the range of 200-400A, and having the x-ray
8 diffraction lines of Table 1 by employing the following steps:

9
10 (i) combining the following reagents in the amounts
11 specified to form a mixture:

12
13 (1) 5 parts of an N-lower alkyl -N-methyl -N'-
14 isopropyl-imidazolium cation which has been ion-
15 exchanged to the hydroxide form;

16
17 (2) 20 parts of an alkali metal hydroxide;

18
19 (3) 100 parts of SiO_2 to 3.5 parts of Al_2O_3 ;

20
21 (4) 20 parts of an alkyl amine.

22
23 (ii) stirring the mixture of step (i) in an autoclave, under
24 autogenous pressure, in a range of from 500 to 1500 rpm
25 for a period of 0.5 to 5 hours ;

26
27 (iii) maintaining the mixture at an elevated temperature for a
28 period of from 40 to 120 hours to form the crystals of the
29 zeolite;

30
31 (iv) collecting the crystals of the zeolite by filtration or by
32 centrifugation;

- 1 (v) subjecting the crystals to calcination and ion-exchange.
2
- 3 (b) mixing the zeolite synthesized in stage (a) with a refractory
4 inorganic oxide carrier precursor and an aqueous solution to
5 form a mixture, the mixture having a molecular sieve content
6 from about 10 to about 90 wt%;
7
- 8 (c) extruding or forming the mixture from step (b) to form an
9 extrudate or formed particle ;
10
- 11 (d) drying the extrudate or formed particle of step (c);
12
- 13 (e) calcining the dried extrudate or formed particle of step (d) ;
14
- 15 (f) loading of the extrudate or formed particle of step(d) with a
16 hydrogenation component to prepare a catalyst precursor
17
- 18 (g) drying the catalyst precursor of step (f);
19
- 20 (h) calcining the dried catalyst precursor of step (f) to form a
21 finished bound dewaxing catalyst.
22
- 23 19. The dewaxing process of claim 18, wherein the zeolite is SSZ-32X.
24
- 25 20. The dewaxing process of claim 19, employing a zeolite prepared from
26 an aqueous solution having a composition, as synthesized and in the
27 anhydrous state, in terms of mole ratios of oxides as follows: (0.05 to 2.
28 0)Q₂O:(0.1 to 2.0)M₂ O: Al₂ O₃ (20 to less than 40) SiO₂ wherein M is
29 an alkali metal cation, and Q is the sum of Q_a an N-lower alkyl- N'-
30 isopropylimidazolium cation, and Q_b, an amine, the zeolite having the
31 X-ray diffraction lines of Table 1, wherein the molar concentration of Q_b
32 is greater than the molar concentration of Q_a.
33

- 1 21. The process of claim 19, wherein Q_a is selected from the group
2 consisting of N-methyl-N'-isopropyl -imidazolium cation and N,N'-
3 diisopropyl-imidazolium cation.
4
- 5 22. The process of claim 19, wherein Q_b is selected from the group
6 consisting of isopropyl, isobutyl, isopentyl, neopentyl or monoethyl
7 amine.
8
- 9 23. The process of claim 19, wherein the zeolite has a constraint index in
10 the range from 8 to 30.
11
- 12 24. The process of claim 19, wherein the zeolite has a silica/alumina ratio
13 in the range from 20 to 40.
14
- 15 25. The process of claim 19, wherein the zeolite is prepared by thermal
16 treating at a temperature of from 200°C (392°F to 820°C (1508°F).
17
- 18 26. The process of claim 19, wherein the zeolite is ion exchanged with
19 hydrogen, ammonium, rare earth metal, Group IIA metal or Group VIII
20 metal ions.
21
- 22 27. The process of claim 19, wherein rare earth metals, Group IIA metals,
23 or Group VIII metals are occluded in the zeolite.
24
- 25 28. The process of claim 19, wherein said feed is selected from the group
26 consisting of hydrotreated or hydrocracked gas oils, hydrotreated lube
27 oil raffinates, brightstocks, lubricating oil stocks, synthetic oils, foots
28 oils, Fischer-Tropsch synthesis oils, high pour point polyolefins, normal
29 alphaolefin waxes, slack waxes, deoiled waxes and microcrystalline
30 waxes.
31

- 1 29. The process of claim 27, wherein Group VIII metals are selected from
2 the Group consisting of platinum and palladium, and/or mixtures
3 thereof.
4
- 5 30. The process of claim 19 wherein said contacting is carried out at a
6 temperature of from 450 - 800°F, and a pressure in the range from
7 about 15 psig to about 3000 psig.
8
- 9 31. The process of claim 30, wherein said pressure is in the range from
10 about 100 psig to about 2500 psig.
11
- 12 32. The process of claim 21, wherein the liquid hourly space velocity during
13 contacting is from about 0.1 to about 20.
14
- 15 33. The process of claim 32, wherein the liquid hourly space velocity is
16 from 0.5 to about 5.
17
- 18 34. The process of claim 19, wherein the hydrocarbon feed is hydrotreated
19 prior to isomerization at a temperature in the range from 325 to 800° F.
20
- 21 35. The process of claim 19, further comprising a hydrofinishing step
22 following isomerization.
23
- 24 36. The process of claim 35, further comprising hydrofinishing of
25 isomerized product.
26
- 27 37. The process of claim 36, wherein hydrofinishing is carried out at a
28 temperature in the range from about 325 to about 590° F and a
29 pressure in the range from about 400 psig to about 3000 psig.